Autonomous Pekapeka Survey Aotea/Great Barrier Island

CONTRACT REPORT 2021_17

Soundcounts

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Cover Image: Kaitoke Swamp margin, Aotea /Great Barrier Island.

Survey planned and completed by Paddy Stewart for the Auckland Council.

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Summary

An autonomous ultrasonic survey for pekapeka/New Zealand long tailed bat (*Chalinolobus tuberculatus*) was completed at 42 stations scatted across Aotea/Great Barrier Island during early summer 2021. The work was completed by Soundcounts for the Auckland Council to assist with the delivery of its Indigenous Biodiversity Strategy.

Bat activity levels were 64 times higher in the northern catchments than those in the south. Analysis of the hourly time/location data indicated that bats were unlikely to be utilising communal/maternal roosts within any of the southern catchments during the short period of this survey.

The consistent timing of bat activity soon after sunset and also prior to sunrise indicated that long tailed bats were roosting within the upper reaches of the Kaiaraara catchment, behind Port Fitzroy. Middle of the night activity on the road saddle between Fitzroy and Okiwi indicated that bats were utilising the road to commute between the two northern catchments. Looking ahead in time, the motu's Dark Sky Sanctuary status may benefit bats as they commute about the island as they are adversely affected by road lighting.

The survey will not have detected all bats, it utilised general patterns of activity across the landscape to make inferences about bat behaviour. The general result from this work is that bats were much more active in the north and this effort replicates the results of previous work by the Department of Conservation in 2004/05. This survey also detected low levels of sparse activity in the southern catchments (FIGURE 1). It is possible that bats will utilise more habitat in the southern catchments as pups are weaned if the population disperses across the landscape.

Further systematic surveys across the island and seasons, utilising longer sampling periods and more input from the community should provide a clearer picture of bat activity about the island.

1. Introduction

1.1 Objective

The objective of this work was to complete an automated ultrasonic bat survey about the motu.

1.2 Brief background

Location

Aotea/Great Barrier Island is the northernmost Ecological District within the Coromandel Ecological Region. Comprising 285 square kilometres, much of the landscape is characterised by volcanic hillsides and associated steep streams which fall abruptly into the outer Hauraki Gulf and the Moana-nui-a-kiwa/ Pacific. Elevation ranges from sea level to 627 m at Hirakimata/Mount Hobson. Eastern catchments are broader and support a greater diversity of habitat (E.g. Kaitoke Wetland). The motu is accredited as a Dark Sky Sanctuary by the International Dark-Sky Association.

Long tailed bat

The North Island long tailed bat (*Chalinolobus tuberculatus* (North Island) is presently classified as "Nationally critical" and estimated to be declining at a rate of 90% over the next three generations[1] (O'Donnell et al, 2017). This is the highest threat level for native species before extinction in New Zealand. To put the NI long tailed bat (LTB) status in context, it is in the same threat tier as iconic bird species such as kakapo (*Strigops habroptilus*).

There have been previous handheld detector surveys (2004/05) about the motu (E. Jamieson cited in Island News, 2020) and restricted range autonomous surveys for short tailed bat (*Mystacina tuberculate*) by John Ogden. Additionally locals have observed bats in the evening (E.g. D. Speer and M. Stewart, pers comm). There are also records of observations about the northern motu (Powell and Erickson, New Zealand Bat database, 1985/86).

[1]Based on a conservative estimate that a generation is 12 years.

2. Method

2.1 Field deployment

Forty-two automated bat detector units (ABDUs); manufactured by Department of Conservation Wellington, were deployed about the motu between December 9 and 12, 2021 (FIGURE 1). The deployment period was shortened due to COVID restrictions and poor weather.

2.2 Data analysis

High frequency signals collected by ABDUs were processed to determine if they originated from target species. Software included Department of Conservation Bat Search Software Version 3.

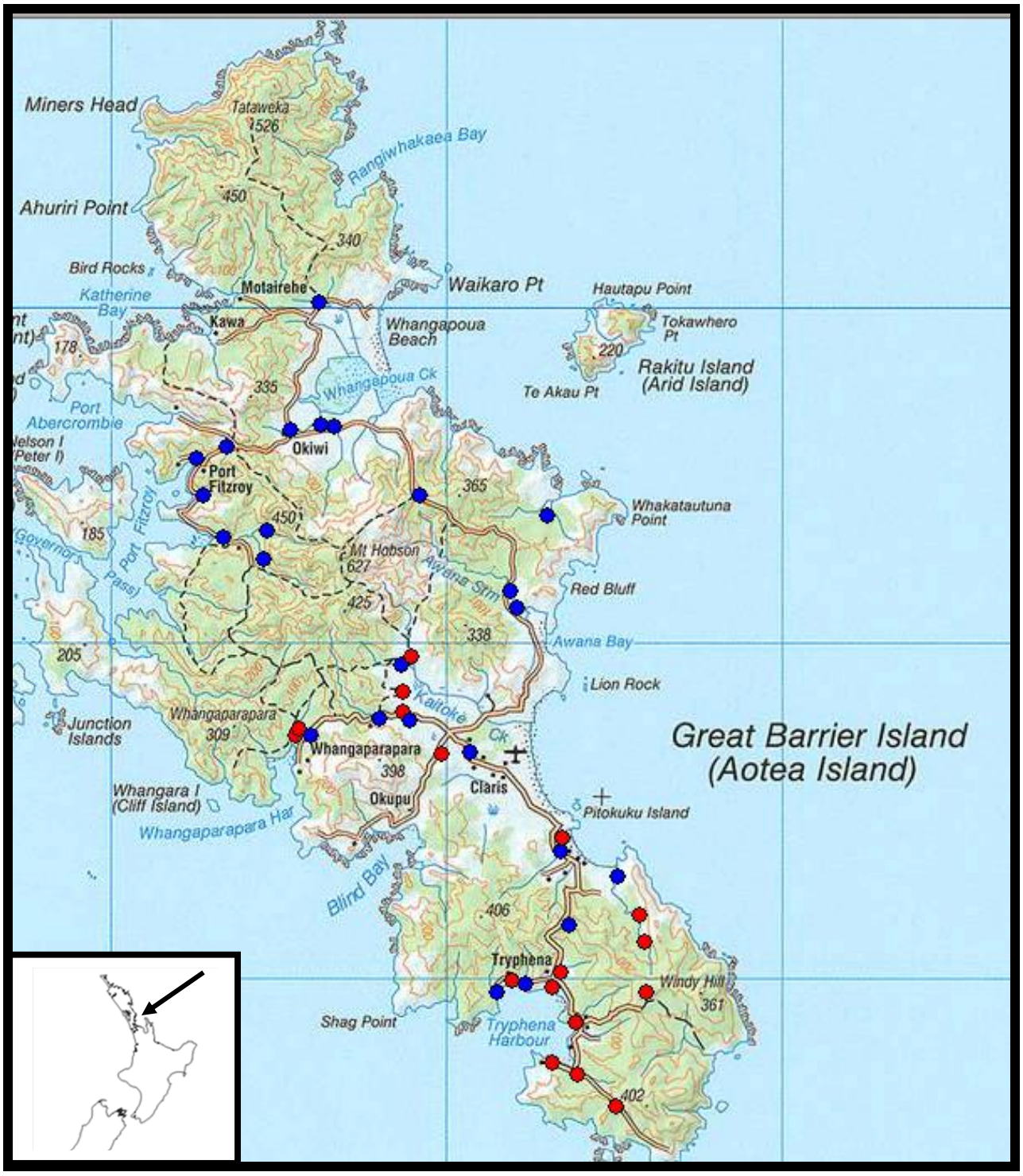

FIGURE 1: AULTRASONIC BAT RECORDER LOCATIONS (RED DOTS SHOW NON DETECTIOINS, BLUE DOTS SHOW DETECTIONS) AOTEA/ GREAT BARRIER ISLAND. GRID SQUARES SHOW 10 KM INTERVALS.

3. Results

3.1 Data collection

Data was successfully collected from all 42 ABDU's. This resulted in a total of 126 ABDU nights' data. There was a total of 9.5 hours effective survey time each night; bats were not detected within the last half hour prior to sunrise at any ABDU station.

A total of 1,232 bat echolocation passes were detected. Most of these were search phase signals. This equated to an average of 9.8 passes/ABDU night of sampling effort.

Most of the activity (1,174 passes (95%)) was detected from the Port Fitzroy and Okiwi (northern) catchments.

3.2 Data interpretation

Northern catchments

The average detection rate/northern ABDU was 39.1 passes/night. A total of 1005 passes were detected from the five Fitzroy ABDUs, equating to an average of 67.0 bat passes/ABDU nights effort (1005/15 ABDU nights effort). Analysis of the hourly time/location data indicated that bats were roosting within the Port Fitzroy catchment (FIGURE 2). Latest activity was 45 minutes prior to sunrise.

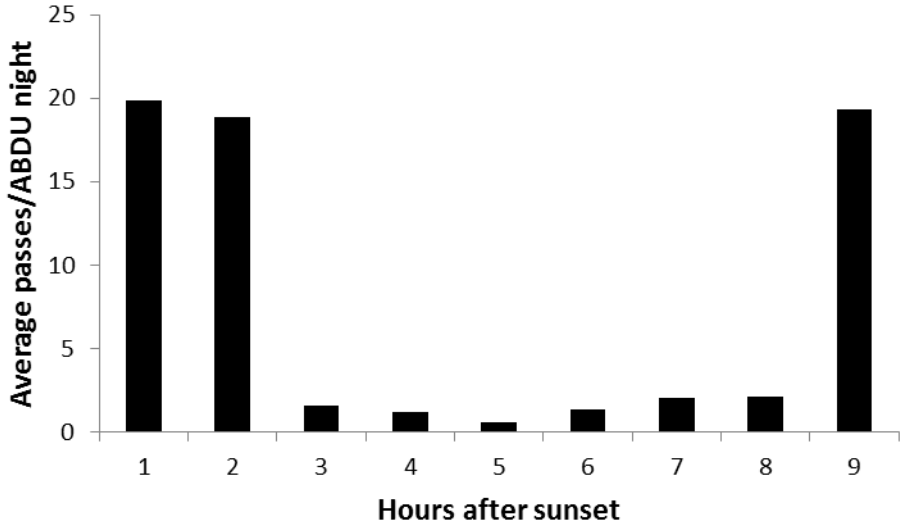

FIGURE 2: BAT ACTIVITY EACH HOUR AFTER SUNSET, PORT FITZROY (N=5ABDUs)

Bat activity at the on the road saddle between the Fitzroy and Okiwi catchments was limited to the middle of the night (FIGURE 3).

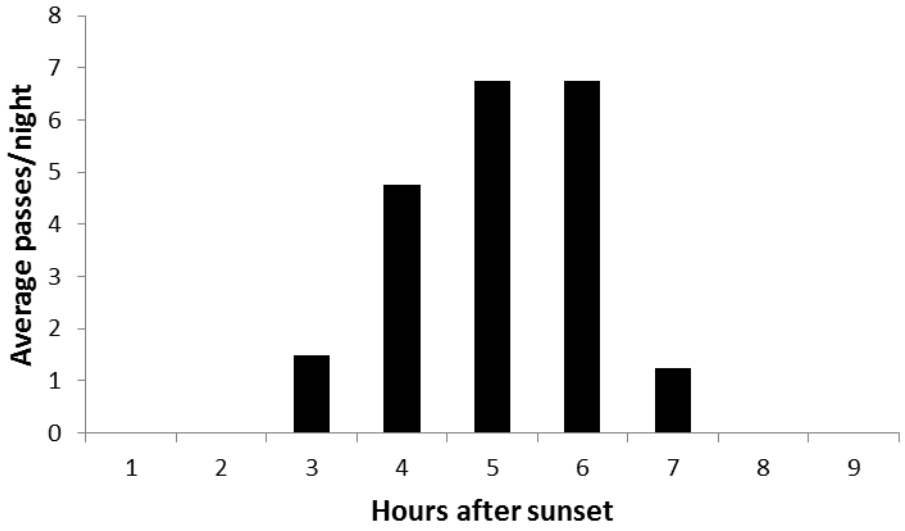

FIGURE 3: BAT ACTIVITY EACH HOUR AFTER SUNSET, PORT FITZROY SADDLE (N=1 ABDU).

Altogether 85 passes were detected from the four Okiwi ABDUs, equating to an average of 7.01 bat passes/ABDU nights effort (85/15 ABDU nights effort). Analysis of the hourly time/ location data indicated that bats were not roosting within the Okiwi catchment (FIGURE 4). Latest activity was 75 minutes prior to sunrise.

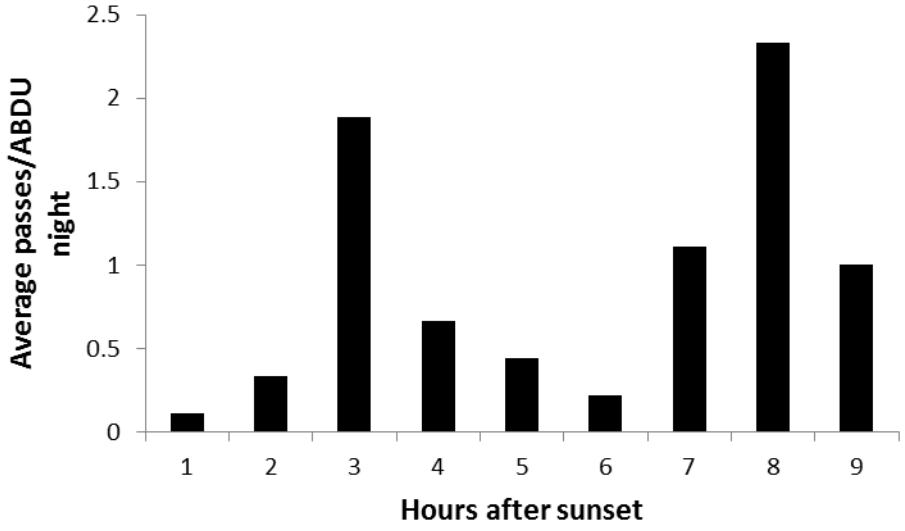

FIGURE 4: BAT ACTIVITY EACH HOUR AFTER SUNSET, OKIWI (N=4 ABDUs).

Southern catchments

A total of 58 passes were detected from the 32 southern catchments ABDUs combined. This equated to an average of 0.6 bat passes/ABDU nights effort (58/96 nights effort). Analysis of the hourly time/location data indicated that a communal/maternal roost was unlikely to be within any of the southern catchments during the short survey period.

4. Discussion

Activity levels were 64 times higher in the northern catchments than those in the south. Analysis of the hourly time/location data indicated that bats were unlikely to be utilising communal/maternal roosts within any of the southern catchments during the short period of this survey.

The consistent timing of bat activity soon after sunset and also prior to sunrise indicated that long tailed bats were roosting within the upper reaches of the Kaiaraara catchment, behind Port Fitzroy (FIGURE 2). Fitzroy activity levels were almost ten times higher than those at Okiwi (FIGURES 2 and 4). Last activity prior to sunrise was 30 minutes later in Fitzroy than Okiwi.

Middle of the night activity on the road saddle between Fitzroy and Okiwi (FIGURE 3) indicated that bats were utilising the road to commute between the two catchments. The survey does not detect all bats, it utilises patterns of activity across the landscape to make generalised inferences. The main result from this work is that bats were more active in the north and this effort replicates the results of previous work in 2004/05 (Island News. 2020). This survey also detected low levels of sparse activity in the southern catchments. It is possible that bats will utilise more habitat in the southern catchments as pups are weaned, if the population disperses across the landscape.

The motu is an accredited Dark Sky Sanctuary and there is little lighting about the islands roads, which pekepeka utilizes to commute between catchments (FIGURE 3). Roadside lighting has been found to increase prey for bat species and to turn them away from their normal commuting route, even at relatively low illumination levels (Jones *et al*, 2019). The dark skies of the motu may well be advantageous to pekepeka.

Further systematic surveys across the island and seasons, utilising longer sampling periods and more input from the community should provide a clearer picture of bat activity about the motu.

Acknowledgements

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